

CLAIMS

1. A method for channel selective power control of a wavelength division multiplexed optical signal, the
5 method including the steps of:
 selecting at least one channel within said optical signal having higher than a desired power level;
 establishing a resonance to the selected channel, the resonance providing a selection region where said
10 selected channel has a substantially increased power density relative to channels out of resonance; and
 attenuating said selected channel a desired amount by adjusting the properties of said selection region.
- 15 2. A method as set forth in claim 1, in which the step of selecting at least one channel having higher than a desired power level is performed by means of spectrum analysis of the wavelength division multiplexed optical signal.
- 20 3. A method as set forth in claim 1, in which the step of establishing a resonance comprises the steps of
 providing an external resonator, which is defined by a first and a second mirror, said first and said second
25 mirror being provided outside and on opposite sides of a waveguiding structure, preferably an optical fibre, carrying the optical signal; and
 deflecting light between the waveguiding structure and the external resonator, said deflecting being
30 effected by a deflector provided in said waveguiding structure.
4. A method as set forth in claim 1, in which the step of attenuating is performed by introducing a loss in the
35 selection region.

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5. A method as set forth in claim 4, in which the step of attenuating is performed by introducing an absorbing element in the selection region.

5 6. A method as set forth in claim 3, in which the step of attenuating is performed by introducing an absorbing element inside the external resonator.

7. A method as set forth in claim 4, in which the step
10 of attenuating is performed by making the selection region leaky, light thereby being caused to leak out of the same.

8. A method as set forth in claim 3, in which the step
15 of attenuating is performed by changing the phase of the selected channel in the selection region relative to the phase of the selected channel in the waveguiding structure, thereby causing destructive interference on the selected channel.

20 9. A method as set forth in claim 8, in which the phase of the selected channel is changed by making a parallel displacement of the first and the second mirror with respect to the waveguiding structure.

25 10. A method as set forth in claim 8, in which the phase of the selected channel is changed by altering the refractive index in at least some portion of the external resonator, thereby altering the optical path length in
30 the resonator.

11. A method as set forth in claim 9 or 10, further comprising the step of altering the separation between the first and the second mirror.

35 12. A method as set forth in claim 1, further comprising the steps of

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18. A method as set forth in claim 17, in which the resonance is established by arranging a chirped Bragg grating in the waveguiding structure, said grating being resonant to different wavelength channels at different portions along the same.
19. A method as set forth in claim 18, in which the selection region is comprised within the resonance, and attenuation is provided by introducing a loss in said selection region.
20. A method as set forth in claim 19, in which the selection region is made leaky by bending a selected portion of the waveguiding structure, light of predominantly the selected channel thereby being caused to leak out from the selection region.
21. A method as set forth in claim 19, in which the selection region is made leaky by moving a light guiding probe close enough to the waveguiding structure to allow evanescent coupling of light from the waveguiding structure into said probe.
22. A method as set forth in claim 3, in which the deflector is provided within an internal resonator in the waveguiding structure, thereby enhancing the spectral selectivity of the channel balancing.
23. A method as set forth in claim 3, further comprising the step of tuning the external resonator to the wavelength of the selected channel.
24. A method as set forth in claim 23, in which the step of tuning the resonance is performed by adjusting the separation between the first and the second mirror.

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36. An arrangement as set forth in claim 35, comprising a plurality of attenuators and a plurality of resonators, said attenuators and said resonators being arranged to attenuate a plurality of wavelength channels within a wavelength division multiplexed optical signal.
37. An arrangement as set forth in claim 35, further comprising a controller, said controller being arranged to receive, from the spectrum analyser, information identifying the at least one channel having higher than a desired power level, and to control the attenuator to provide a desired level of attenuation to said at least one channel.
38. An arrangement as set forth in claim 37, wherein the spectrum analyser is operatively connected to the optical fibre upstream from the attenuator.
39. An arrangement as set forth in claim 37, wherein the spectrum analyser is operatively connected to the optical fibre downstream from the attenuator.
40. An arrangement as set forth in claim 38, wherein a second spectrum analyser is operatively connected to the optical fibre downstream from the attenuator, said second spectrum analyser also being operatively connected to the controller.
41. An arrangement as set forth in claim 35, wherein the resonator is an internal resonator arranged in the waveguiding structure, said internal resonator comprising a chirped Bragg grating.
42. An arrangement as set forth in claim 35, wherein the resonator is an external resonator arranged outside the waveguiding structure, said external resonator being defined by two mirrors arranged outside and on opposite

density relative to wavelength intervals out of resonance; and

a controller arranged to adjust said resonator such that a controlled amount of power is removed from the
5 resonant wavelength.

48. A device as set forth in claim 47, wherein the resonator is controllable such that the wavelength interval to which the resonator is resonant can be tuned,
10 thereby allowing removal of power from different wavelength intervals at different instants.

49. A device as set forth in claim 47, wherein the resonator is an external resonator arranged outside the
15 waveguide, said external resonator being defined by two mirrors arranged outside and on opposite sides of the waveguide, said external resonator being coupled to said waveguide by a deflector.

50. A device as set forth in claim 49, wherein the deflector comprises a blazed phase grating provided in a
20 core of the waveguide.

51. A device as set forth in claim 49, wherein the
25 controller is operative to change the phase of light of the resonant wavelength in the resonator relative to the phase of light of the same wavelength in the waveguide, thereby causing destructive interference on said wavelength.

52. A device as set forth in claim 51, wherein the
30 controller is operative to change the phase of light in the resonator by causing a parallel displacement of the external resonator with respect to the waveguide.

53. A device as set forth in claim 51, wherein the
35 controller is operative to change the phase of light in

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